Discovery Program 2004 Announcement of Opportunity Q&A

Updated July 2, 2004

This document may be found by selecting "AO Q&A" at
http://discovery.larc.nasa.gov/discovery

Other questions may be addressed to Susan Niebur, Discovery Program Scientist, susan.m.niebur@nasa.gov. Questions (which may be abridged for brevity) and answers will be posted at the above URL twice a week, sorted by category and entered into the change log below.

Categories of Questions

Science (S)
Technology (T)
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Log of Questions

April 23:	T-1 through T-4, M-1 through M-3, P-1 through P-7, LV1 through LV-5, I-1
April 28:	T-5, P-8, LV-6
April 29:	S-1, S-2, M-4, P-7 updated, P-9, LV-7
May 11:	S-2 updated, S-3, M-5, M-6, P-10, P-11
May 18:	P-12
May 21:	T-4 updated, T-6, P-13, LV-8
May 26:	P-14, LV-9
May 28:	P-15
June 3:	LV-7 through LV-9 updated, LV-10
June 9:	P-10 updated, P-12 through P-14 updated
June 22:	Note: the last update to this Q&A document will be posted on July 2, two weeks prior to the proposal due date.
July 1:	LV-11
July 2:	P-16, LV-11 updated

Science

S-1. Is the Planetary Data System the appropriate archive for a mission that is performed under the Astronomical Search for Origins extrasolar planetary systems element that is a part of this AO? Would archiving of such ASO data in one of the other OSS data archives be allowed? I do not see in the AO specific mention of the requirements for archiving ASO data.

ASO data may be archived in the appropriate NASA archive within the constraints outlined in AO Amendment 1, posted on 4/30/04, and repeated in the answer to question S-2.

S-2. The AO requires that data be archived in the Planetary Data System (PDS) archive. Observatory-type missions, such as might address the Astronomical Search for Origins goals of the AO, will produce data in formats that are likely to be very different from what the PDS supports. NASA maintains at least two other archives - MAST at Space Telescope Science Institute, and IRSA at the Infrared Processing and Analysis Center, that would be more appropriate for observatory type data. Is it acceptable to propose that data would be archived at one of these archives, rather than the PDS, as appropriate?

Data from missions engaged in the search for extrasolar planets may be archived at the Multimission Archive at Space Telescope (MAST) ~~at Johns Hopkins University~~, the Infrared Science Archive (IRSA) at the California Institute of Technology, the Michaelson Science Center (MSC) at the California Institute of Technology, or the High Energy Astrophysics Science Archive (HEASARC) at Goddard Space Flight Center, as appropriate for the wavelength regime of the data being archived. The data must be delivered in FITS format. It is the responsibility of the proposer to conform with the other data archiving requirements outlined in this AO. For further details on archiving the data in these archives, contact Jeff Hayes (202-358-0353 or Jeffrey.j.hayes@nasa.gov) or Alan Smale (202-358-2016 or alan.smale@nasa.gov)

S-3. Could you please clarify how the use of collaborators should be addressed in our proposal responses to this AO.

Collaborators are to be listed on the cover page as team members. Their contributions should be further discussed where appropriate. The NASA OSS definition of a collaborator is reproduced below.

Collaborator – A Collaborator is an individual who is less critical to the proposal than a Co-I but who is committed to provide a focused but unfunded contribution for a specific task (Note: if funding support is requested in the proposal, such a person must be identified in one of the other categories).

Technology

T-1. Regarding power supplies, can mini-RTGs be used? Mini-RHUs?

No. While we are aware that there are concepts for mini-RTGs in development, none are projected to be complete for a 2009 launch.

T-2. Can the JPL initiative to produce an impact hardened mini-RTG be incorporated into the mission design?

No. See Question T-1.

T-3. We are considering the application of small Radioactive Power Sources to a mission. At present, some RPS concepts use RHU's, while others are built around somewhat larger sources. What is the maximum amount of radioactive material that's allowable in a Discovery proposal?

The 2004 Discovery Program AO does not allow small RPSs. As stated in section 5.3.2, only RHUs and radioactive material sources for science instruments are permitted.

T-4. When will the reference documents "Specifications for Radioisotope Heater Units (RHUs) for Discovery" and "Guidelines and Criteria for the Phase A Concept Study" be available?

The RHU document is in final review and will be posted to the Discovery Program Library next week. The Guidelines and Criteria document will be posted in mid-May. (Update: the RHU document was added to the DPL on April 27, and the Guidelines and Criteria document was added to the DPL on May 17.)

T-5. We understand that the Terrestrial Planet Finder (TPF) project is developing a large primary mirror as a technology demonstration (the TPF Technology Demonstration Mirror) that will be completed in 2006. Can proposers to this Discovery AO use this mirror as Government Furnished Equipment? If so, what is the process for obtaining interface and specification information?

No, the TPF Technology Demonstration Mirror is not offered through this AO as GFE.

T-6. In section 7.2.4 it states that "Investigations proposing new technology, i.e., technologies having a Technology Readiness Level (TRL) less than 7 (see TRL Definitions in the DPL), will be penalized for risk if adequate backup plans to ensure success of the mission are not described," while in Appendix B, section G it states: "If any fallbacks/alternatives exist and are planned (desirable but not mandatory), a description of the cost, schedule, and performance liens they will impose on the baseline design and the decision milestones for their implementation." It appears that one can propose new technology - using the 5 extra pages offered - and only describe how it will be at TRL 6 by CR without any mandatory fallback/alternatives while at the same time being penalized for not describing backup plans (fallback/alternatives).

Correct. A proposal may propose new technology and describe how it will be at TRL 6 by CR without incorporating backup plans. It won't be returned for noncompliance. However, if backup plans are not described, the investigation will be penalized for risk.

Management

M-1. What is the procedure for involving industrial partners?

The Discovery Program encourages teaming arrangements that utilize industry participation to the fullest extent possible, but leaves the specifics of such arrangements up to the PI and his/her team (compliant with NPR 7120.5B, found in the DPL).

M-2. Can the Discovery Program explain the rationale for having the JPL Program Office award and administer contracts with all successful offerers? [If a JPL burden is applied to contracts outside of JPL, doesn't this provide an unfair cost advantage to JPL offerors?]

The Discovery/New Frontiers Program Office is responsible for Program management of all Discovery missions. In order to effectively perform in this capacity, the Discovery/New Frontiers Office will administer contracts with successful proposal teams. There will be no costs applied to non-JPL missions that are not applied to JPL-proposed missions.

M-3. Section 5.4.2 says, "Each Discovery investigation proposal must have a fully qualified and experienced PM who will oversee the technical implementation of the project. This PM must be named at time of proposal." Surely you did not mean that for Step 1. That would be a major break from the past.

Yes, it is. This is a requirement of the 2004 Discovery AO, as it was for the 2003 New Frontiers AO. Each proposal must include a named PM. Please note also that after proposal, any change "requires concurrence by the NASA Discovery Program Management."

M-4. How do the cost models used by evaluators deal with full cost accounting?

The difference between the cost models before full cost accounting and after full cost accounting is that now the true actual costs for NASA Civil Service workforce (labor and overhead) and facilities used by the project are charged to the project. Before full cost accounting, NASA civil service workforce and facilities were covered by different funding sources (different line item in the NASA budget). True full costs were not charged to the project.

Full cost accounting for the civil service workforce is now modeled on a case by case basis depending on the specific center workforce rates and facilities planned for use.

Discovery Program costs for HQ civil servants involved with overseeing the projects as well as the workforce in the new Discovery and New Frontiers Program Management Office at JPL are not included in the cost analysis for any mission proposal.

M-5. Will NASA consider dropping the new requirement to name a project manager in Step 1?

No. This requirement was used in the 2003 New Frontiers AO and will be used in the 2004 Discovery AO. See also questions M-3 and M-6.

M-6. May a proposing institution name a project manager to more than one proposal?

Yes. In the event that more than one proposal with the same PM is selected to perform a Concept Study, the proposing institution may choose to replace the PM on the second (and third) proposal(s), with HQ concurrence.

Proposals

P-1. What will the Discovery Program do to limit the risk inherent with increasingly back-loaded funding profiles? [The funding profile appears to have reduced early funding with respect to New Frontiers and Mars Scout Step 1 AOs.]

Experience has shown that more time and funding may be needed during the requirements definition in Phase A and B. The new profile includes significant increases in both Phase A and B as compared to the 2000 Discovery AO. The 2004 Discovery AO also shows proportionately more funding available in the first two years than either Mars Scout or New Frontiers. The proposer is cautioned about comparing absolute amounts between AO cycles, as the funding available to and from NASA is distributed by Fiscal Year; proposers are free to distribute that between phases as they wish. The proposer is further cautioned when comparing these numbers, as missions begin Phase B during different months of the year; since Mars Scout began theirs in August 03, and Discovery is scheduled to begin theirs in November 05, even more money per month is available to Discovery than first appears.

P-2. Can the Discovery Program confirm the software IV&V costs are not to be included in the NASA OSS Cost cap?

Yes. The costs for the NASA IV&V Facility in West Virginia will be covered by NASA through the Discovery Program, but outside each project's NASA OSS Cost Cap.

P-3. Can the Discovery Program explain the rationale for adding a clause to enable acceptance of late proposals?

Yes. The language regarding late proposals is mandated by the NASA Federal Acquisitions Regulations (FAR) Supplement 1815.208 as well as NASA FAR Supplement 187.705-1.

P-4. Should the use of "may" with respect to "Navigation services" be interpreted to mean Proposers "may" obtain "Navigation services" from other than JPL?

Yes.

P-5. Should the use of "may" with respect to "Navigation services" be interpreted to mean JPL also "may" refuse to provide services?

This section (5.3.3) refers to the use of the Deep Space Network (DSN). If a selected mission requires the use of the DSN (and this use was budgeted in the proposal), NASA HQ will work with the JPL DSN management to ensure availability of the DSN.

P-6. Low Risk is referenced in Section 5.1 as critical to selectability, but criteria for determining low risk are not provided. What criteria will be used to evaluate risk?

A low risk mission is one whose required resources (schedule and funding reserves; reserves and margins on physical resources such as mass, power and data; descope options; fallback plans; and personnel) fit well within the resources available. See also the TMC presentation from the Preproposal Conference.

P-7. [The amounts listed in Appendix F sum to $314M] This converts to FY 2004 $290.4M. This doesn't seem to include phase E, so it would seem that a minimum of FY 2004 $69.6M is reserved for phase E. Also, the numbers in the equivalent appendix of the 2000 Discovery AO were higher even though the cost cap then was supposed to be lower. Is Appendix F (the funding profile) really correct? And is the real cost cap effectively less than FY 2004 $360M, unless you can manage to spend nearly $70M in phase E?

Yes, Appendix F is really correct. However, the real cost cap is indeed $360M. The Discovery Program has limited funds in any given fiscal year, and this distribution is calculated to fit within the available resources, while providing the

proposer with an appropriate funding profile. Please note that FY2010 begins on October 1, 2009 and the end of the launch window is December 31, 2009. A spend rate for this time period equivalent to that of FY2009 would consume approximately $23M of the FY2010 funds, leaving a more reasonable amount for Phase E operations.

No fixed FY2010 budget number is listed because the NASA forecast for specific budgets beyond FY2009 is not yet available. See P-1 for further discussion of this topic, but please understand that the recent cost cap increase was implemented to cover the increase in costs – NOT to allow a greater purchasing power for Discovery missions. Discovery missions are charged with doing focused scientific investigations, and the proposer would do well to concentrate on a focused topic achievable within the stated funding constraints.

Please note that the funding profile was rephased on 4/30/04, by Discovery AO Amendment 1, to allow access to up to $120M in FY2008 and $80M in FY2009. No additional funds are available. Proposers working to the original profile will not be penalized, as the language in Appendix F clearly states "unused portions of funds in each of these years can be used in the following year(s) if necessary."

P-8. The AO states that the cost cap is in FY04 dollars. In Appendix B, costs are asked for in the title of Table B-1 in FY04 dollars, but in the column headings of that table, FY03$ is shown. Is FY04$ correct?

Yes, FY04$ is correct. This was a typo that crept in as the AO release was delayed. Please use FY04$ when completing this table. This will also be announced in an upcoming AO mod.

P-9. Proposers are required to meet subcontracting goals for SDBs. What level of subcontracting counts? Since JPL will now be issuing the project contracts, how will this affect the evaluation of subcontracting goals?

All subcontracts over $500k are counted, regardless of level. JPL's issuance of contracts will therefore have no effect on SDB evaluation.

P-10. Will NASA extend the launch-no-later-than date beyond December 31, 2009?

~~No. The launch no-later-than date of December 31, 2009, is a fixed parameter of this AO.~~

updated June 9, 2004 – please see P-14 for the revised answer.

P-11. Our institution has is own inflation methodology, and our subcontractors/partners provide to us their RY costs based on their own derived forward pricing rates. If we were to use the NASA New Start Inflation Index for all of our cost elements (including our

subcontractors/partners), our RY costs would be knowingly understated compared to the costs we expect to incur. If we use our own forward pricing rate methodology, would we be deemed non-compliant with the AO?

Proposing institutions may use their own forward pricing rates ***as long as*** the incorporated inflation index ***does not*** drop below the values listed in the NASA New Start Inflation Index listed in Table B-3 of the AO ***in any year***. The use of inflation rates other than those listed in Table B-3 must be justified in the corresponding discussion, as stated in Section I of Appendix B.

P-12. Will proposals to this AO be rejected for being non-compliant if they exceed the published cost profile by any amount?

~~Yes.~~

updated June 9, 2004 with the following language:

Proposed budget profiles that deviate as much as 15% per year (that is, in one or more funding years) from the profile provided in Appendix F will NOT be judged non-compliant with the terms of this AO, as long as the total cost cap of $360M is not exceeded. However, the profile provided in Appendix F is to be considered optimal, and justification of all deviations must be provided.

This change has also been posted as an amendment to the AO.

P-13. The NASA New Start Inflation Index (Table B-3) provided in the Discovery AO has some inaccuracies and one error:

	2004	05	06	07	08	09	10
Cum Infl index given:	**1.0**	**1.019**	**1.040**	**1.062**	**1.094**	**1.106**	**1.129**
Corrected:	**1.0**	**1.019**	**1.039**	**1.061**	**1.083**	**1.105**	**1.127**

Should we be doing anything about this?

As the Annual Inflation Rate is shown only to one decimal point and the Cumulative Inflation Index is shown to three decimal points in the New Start Inflation Index Table, it is more accurate to use the cumulative inflation index as shown in Table B-3. However, proposers will not be penalized for using the annual inflation rates instead. The FY2008 cumulative index shown does have a typo: It should read 1.084 instead of 1.094.

updated June 9, 2004 with the following language:

This correction has been posted as an amendment to the AO.

P-14. Can the Discovery launch window be extended by 6 to 12 months to broaden the range of opportunities that investigators can propose to NASA?

(Question answered by Andy Dantzler, Discovery Program Director)

We have evaluated the pros and cons of slipping out the launch constraint from a long term program viability and sustainability perspective~~, and have decided to hold the no-later-than launch date at December 31, 2009.~~

The fundamental goals of the Discovery Program are to facilitate Solar System Exploration through low cost missions launched every 18-24 months. In fact, The Decadal Survey strongly suggested that the Program maintain the 18 month launch frequency.

Recognizing the need to better synchronize the Program with the celestial mechanics involved in certain mission targets, we plan to release the next AO in approximately February or March 2005.

Andy Dantzler
Director, Discovery Program

updated June 9, 2004 with the following language:

Proposed launch dates as late as June 30, 2010 will NOT be judged non-compliant with the terms of this AO. However, the stated December 31, 2009, launch date is considered the optimal no-later-than launch date, and justification of any proposed extension must be provided.

This change has also been posted as an amendment to the AO.

P-15. How should the target dates on page 41 of the AO (e.g. Concept Study due, Downselect, Confirmation for flight dates) be interpreted? No-Earlier-Than dates? If so, can one select a later date than August 16, 2006 for Confirmation for flight?

These dates are simply approximate dates to be used for planning purposes; they are not intended to be NET or NLT dates.

Proposal teams may propose Confirmation dates earlier or later than August 16, 2006, without penalty. This date should correspond to the approximate end of the proposed Phase B, whose length is not explicitly specified in this AO.

P-16. If the endorsement letters contain signatures from both the individual and the authorizing official as well as the amount of contribution ($ and FTE), is it necessary to have the signatures of the individual and authorizing official and the amount of contribution on the resumes? See section 6.3.2, Appendix B (2 and 4). In other words, does the authorizing official have to sign both the endorsement letter and the individual's resume?

The amount of contribution must be included on the resumes. However, if the amount of contribution is also listed in the Letter of Endorsement that is signed by the authorizing official, the authorizing official need not sign the individual's resume as well.

Launch Vehicles

LV-1. We are looking at a mission proposal in which the allowable launch mass is under 700-kg. The ELV performance website now states that payloads that are less than 680-kg "may require NCS modifications". In the recent past, the threshold in which light payloads required NCS modifications was 567-kg. Is this change real, and if so what was the reason for the change?

The current website number is the guaranteed contractual number with margin to ensure that the NCS can handle a specific spacecraft. Any lower numbers are not contractual and should not be used as such. The 567 kg number stated may have been a specific spacecraft configuration. The issue is the ability of the 3rd stage NCS to control coning during the end of the 3rd stage burn with a light spacecraft. Example: If a certain spacecraft mass is in the range of 445 to 465 kg and is also a very flat (disk-like), very spacecraft specific, they would have to fly a 33 inch tall PAF to adjust the mass properties characteristics to bring them within the family of previously flown configurations. The mass penalty would be the additional PAF height. (33 inch (new) - 12 inch (normal)). This issue would be very spacecraft configuration dependent and would have to be addressed on a spacecraft specific basis. The current website number is the plan to number you should use. If a deviation or further NCS details are required, a mission unique funded study may have to be initiated.

LV-2. I was told that Missions of Opportunity for Instruments that would utilize the International Space Station or that would be launched by the Space Shuttle were specifically prohibited in the current Discovery Program AO. I have looked through this AO several times and can not find anything to substantiate such a statement. I may be looking in the wrong place, or I may have been misinformed. Can I propose a Mission of Opportunity to build and fly an instrument to be mounted on the International Space Station that would address one or more of the scientific goals of the Solar System Exploration Division?

The 2004 Discovery AO does not permit the use of the Space Shuttle. Missions must be launched using ELVs (Sections 1.1 and 5.11.2). Missions of Opportunity to the International Space Station are not specifically prohibited, but the Space Shuttle may not be used as a launch vehicle.

LV-3. What will the Discovery Program do to limit the impact to proposed missions of steadily increasing LV costs?

The Discovery Program has increased the Cost Cap for the 2004 Discovery AO from $299 (FY99$) to $360 (FY04$) in order cover the increased launch vehicle costs quoted in the DPL, inflation, and other factors. The Discovery Program will, as in years past, cover any increase (or benefit from any decrease) in the cost of the launch vehicle after selection.

LV-4. The reduced inflation index further increases the LV costs in FY04 dollars with respect to the New Frontiers Step 1 AO.

The Discovery Program uses the "NASA New Start Inflation Index" required by NASA for new procurements.

LV-5. Are the extra costs indicated in the ELV document in the DPL applicable to use of <u>any</u> radioactive material?

Yes, for planning purposes, this is a fully inclusive cost for all tasks connected with radioactive material. (But please also read answers to questions T-1, T-2, and T-3 above.)

LV-6. The launch vehicle guidelines do not include the Delta II 2420. Is the 2420 configuration available and what is the cost by year?

Yes, the Delta II 2420 is also available for this launch opportunity. The costs by fiscal year will be added to the Discovery AO Launch Services Information Summary in the Discovery Program Library.

LV-7. Shuttle launches are specifically excluded by the Discovery AO. I can't find anything in the AO that excludes Shuttle recovery, however. Am I missing something?

~~The Space Shuttle should not be assumed as the return vehicle if return is targeted for 2010 or later. Retirement of the shuttle is still planned to occur by the end of 2010. Other than the Space Shuttle, currently planned ISS access vehicles do not provide any significant recoverable down-mass capability. However, a recent Assured Access to Station (AAS) study concluded that it was possible to develop a domestic capability to meet most ISS resupply and return requirements. The return of hardware from ISS post Shuttle retirement is still under considerable discussion.~~

(updated June 3, 2004)

The Space Shuttle should not be assumed as the return vehicle. Shuttle use is focused on ISS assembly, and retirement of the shuttle is planned to occur by the end of 2010.

LV-8. If a Project launches in December of 2009, which is 3 months into FY2010, why is there not a larger percentage of the LV payments made in 2010? All of the launch campaign will be occurring in FY2010 so it seems a larger percentage of the LV payment should occur in FY2010. Also, would it be possible to defer payment of fee (profit) on the LV until after the successful launch occurs?

(updated June 3, 2004)

The cost data provided in the AO reflects the entire mission budget, of which, the Launch Vehicle is by and far the largest piece of the budget. The contract that will be utilized to procure this launch service has pre-negotiated payment schedule as part of the terms and conditions of the contract. The Contractor is not obligated to deviate from that negotiated schedule. The payment schedule laid out in the contract is fairly flat. The overall budget includes all services necessary to integrate the mission, not just those provided by the launch service contractor. The costs associated with these services have been phased to reflect when they would be required during mission integration~~. The launch service contract does not have any additional profit or incentive payments associated with the mission success; therefore, there is no post mission payment reflected in the cost profile. The last milestone payment is paid at Launch.~~ Any deviations from the launch service contract payment schedule would require a bi-lateral agreement between NASA and that Launch Service Contractor.

LV-9. The launch vehicle guidelines do not include the Delta II 7320. Is the 7320 configuration available and what is the cost by year?

Yes, the Delta II 7320 configuration is available. Other Delta II available configurations are the 2325, 2420, 2425, 2920, 2925, and 2925H. Annual and total costs will be posted in the Launch Information Services document in the Discovery Program Library after approval by NASA HQ (Code M).

(updated June 3, 2004)

New cost table for additional vehicle configurations is provided below.

Discovery 11 Pricing Exercise

- All costs are estimated in real-year dollars (order year = L-30) based on current NLS contracts information.
- There are no launch penalty costs assumed in budget
- Assumed launch date of December 31, 2009. Rev. 2

		NOA $M					
Launch Veh.	Launch Site	FY06	FY07	FY08	FY09	FY10	Total
Delta II 2320	CCAFS	0.6	15.9	23.5	33.4	0.4	$73.8
Delta II 2325	CCAFS	0.6	16.5	24.5	34.3	0.5	$76.4
Delta II 2420	CCAFS	0.6	16.1	23.9	33.8	0.5	$74.9

Delta II 2425	CCAFS	0.6	16.8	24.9	34.8	0.6	$77.7
Delta II 2920	CCAFS	0.6	17.6	26.2	36.0	0.7	$81.1
Delta II 2925	CCAFS	0.6	18.3	27.1	37.0	0.8	$83.8
Delta II 2925H	CCAFS	0.6	20.9	31.0	40.9	0.8	$94.2

LV-10. What are the launch service costs in FY04 dollars, or the inflation factor used to determine then year dollars?

The general inflation factors to be used are "NASA NEW START INFLATION INDEX" shown below. For AO evaluation purposes only.

FiscalYear	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
InflationRate	0%	1.9%	2.0%	2.1%	2.1%	2.0%	2.0%
Cumulative Inflation Index	1.0	1.019	1.040	1.062	1.084	1.106	1.129

LV-11. The Discovery Program Director has announced a change to this AO's launch no-later-than date, from December 31, 2009, to June 30, 2010. What is the revised payment schedule for the new launch date?

The Discovery Program Director would like proposers to use the December 31, 2009, payment schedule for planning purposes.

International Partnerships

I-1. Are foreign partners/collaborators allowed for Discovery Missions?

Yes. See Section 5.10 of the AO for an overview.